

**National 5**

**Homework EF8**

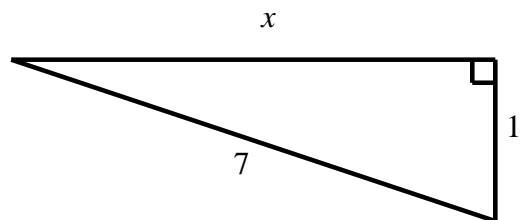
1. Simplify

(a)  $a^5 \times a^3$  (b)  $a^6 \div a^{-1}$  (c)  $\frac{a^4 \times a^3}{a^{-2}}$   
(d)  $a^3 \cdot 4$  (e)  $\sqrt{x}^6$  (f)  $a^{-1} \cdot 4$

2. Evaluate

(a)  $3^4$  (b)  $4^{-2}$  (c)  $16^{\frac{1}{2}}$   
(d)  $8^{\frac{2}{3}}$  (e)  $27^{\frac{1}{3}}$  (f)  $2^{-1} - 3^{-2}$

3. Find the value of  $x$  in the following right-angled triangle.  
Give your answer as a surd in its simplest form.



4. Simplify (a)  $\sqrt{32} + 2\sqrt{2} - \sqrt{50}$  (b)  $\sqrt{2} \sqrt{6} - \sqrt{2}$

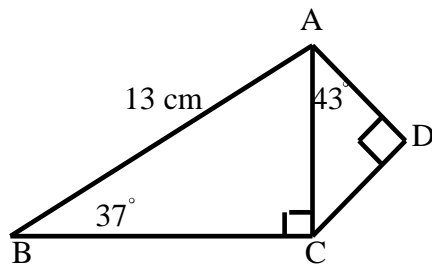
5. Express with rational denominators:

(a)  $\frac{1}{\sqrt{2}}$  (b)  $\frac{3}{\sqrt{5}}$  (c)  $\frac{4}{\sqrt{2}}$  (d)  $\frac{4}{\sqrt{3}}$

6. Simplify:

(a)  $(a^3)^4$  (b)  $\frac{a^2 \times a^{-3}}{a \times a^3}$  (c)  $\frac{8t^2}{2t^{\frac{1}{2}}}$  (d)  $6y^5 \div 2y$

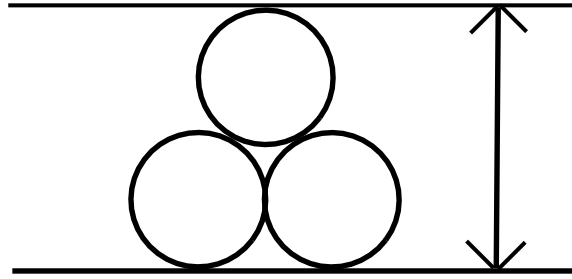
7. Calculate the length of AD.



8. Solve, leaving your answer as a fraction, if necessary:

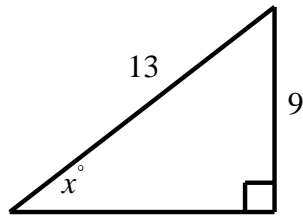
(a)  $5x - 3 = 2x + 11$  (b)  $4x - 7 = x - 10$  (c)  $3 \cdot 1 - x = 2x$

9. Find the total height of the following stack of touching circles, each with radius 5 units.  
[It will help to join the centres.]

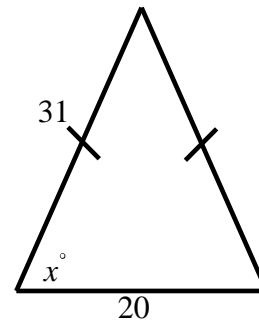


10. Find the size of the angle  $x^\circ$  in each of these triangles.

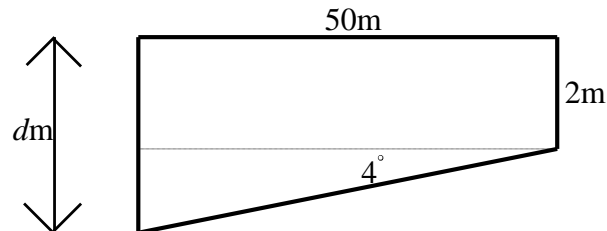
(a)



(b)



11. The diagram below shows the cross-section of a swimming pool 50m long. Calculate its maximum depth,  $d$  metres, giving your answer correct to 3 significant figures.



12. Rhombus ABCD has diagonal, AC, measuring 16cm and shorter diagonal, BD, measuring 12cm.
- Draw a sketch of rhombus ABCD.
  - Calculate the area of rhombus ABCD.
  - Calculate the length of a side, and hence the perimeter of the rhombus ABCD.